What is claimed is:

1. A method for fusion-splicing a first optical transmission member to a second optical transmission member with a heat source, the first and second optical transmission members each having a retaining member surface configured to form a continuous joint joining the first and second optical transmission members, the method comprising:

disposing the first optical transmission member in a first retaining member;

disposing the second optical transmission member in a second retaining member, the first and second retaining members are composed of similar or like materials;

aligning corresponding optical surfaces of the first and second optical transmission members along one axis;

directing the heat source to heat a specific region of the retaining member surfaces to be joined;

adjusting a temperature level of the heat source to reach a temperature equal to or higher than the softening temperature of at least one of the retaining members surfaces to form a softening region thereon;

placing the retaining member surfaces in proximity to one another, thereby achieving the fusion-splicing; and

allowing a joint formed intermediate one end defined by the first retaining member and another end defined by the second retaining member to cool.

2. The method of claim 1 wherein the heat source includes one of an electric arc and a laser.

3. The method of claim 2 wherein the laser operates in a wavelength region of about 9 to about 11 μm.

4. The method of claim 3 wherein the laser is a CO_2 laser.

5. The method of claim 1 wherein the retaining member surfaces comprise silica-based glasses.

6. The method of claim 1 wherein the one end of the first retaining member is ground and polished.

7. The method of claim 1 wherein the second retaining member includes a glass capillary tube and the second optical transmission member includes an optical fiber, the optical fiber being disposed in the glass capillary tube, the tube is heated at the another end on a periphery of the tube to form the softening region and the joint.

8. The method of claim 7 wherein an anti-reflection coating is applied to end face portions of the optical fiber and the first optical transmission member to be joined prior to the aligning and fusion.

9. The method of claim 7 wherein the directing of the heat source includes heating the optical fiber and the glass capillary tube, through which the optical fiber passes, at the another end.

10. The method of claim 9 wherein the optical fiber forms the joint with respect to the first optical transmission member and corresponding retaining member surfaces associated with each.

11. The method of claim 7 further comprising:

bonding the optical fiber in the glass capillary tube with an adhesive.

12. The method of claim 1 wherein the first and second optical transmission members with corresponding retaining member surfaces are aligned but separated by a space, the heat source is directed to form the softening region, and the surface of the first and second optical transmission members at the another end is brought in contact with the softening region of the first retaining member, the contact resulting in heat transfer to the second optical transmission member and second retaining member, which then soften, thereby achieving the fusion-splicing.

13. The method of claim 1 wherein the first and second optical transmission members with corresponding retaining member surfaces are first brought into contact and the heat source is directed to form the softening region where the first and second optical transmission members with corresponding retaining member surfaces are in contact to achieve the fusion-splicing.

14. The method of claim 1 wherein the first and second optical transmission members with corresponding retaining member surfaces are aligned, then brought into contact, then separated by a space, the heat source is directed to form the softening region, and the surface of the second optical transmission member and the second retaining member at the another end is brought in contact with the softening region of the first retaining member, the contact resulting in heat transfer to the second optical transmission member and second retaining member, which then softens, thereby achieving the fusion-splicing.

15. The method of claim 1 wherein both the first and second retaining members have similar thermal and mechanical properties.

16. The method of claim 1 wherein the second optical transmission member includes a plurality of optical fibers forming a fiber optic array and the first optical transmission member includes a plurality of optical waveguides corresponding to the plurality of optical fibers.

17. The method of claim 1 wherein at least one of the first and second retaining members is a unitary substrate.

18. The method of claim 1 further comprising:

covering the first optical transmission member with a cover.

19. The method of claim 1 wherein at least one of the first and second optical transmission members includes one of the following:

at least one optical fiber,

at least one optical waveguide,

a planar waveguide structure,

at least one optical emitting device,

at least one optical detecting device, and

at least one optical reflecting device.

20. The method of claim 1 wherein the first and second retaining members comprise at least one of, including combinations of at least one of the following materials:

metal,

stainless steel,

Fe-Ni-Co alloy,

glass,

organic polymer,

plastic, and

metallized ceramic.

21. The method of claim 1 wherein the first and second optical transmission members depend from corresponding first and second retaining members by at least one of, including combinations of at least one of the following:

metal solder,

glass solder,

organic adhesive,

epoxy, and

ultra-violet cure adhesive (UV-cure adhesive).

22. The method of claim 1 wherein at least one of the optical surfaces of the first and second optical transmission members has a thin film optical coating deposited thereon.

23. An optical device comprising:

a first optical transmission member within a first retaining member; and

a second optical transmission member within a second retaining member, wherein the first and second retaining members are fusion-spliced using a heat source forming a continuous joint joining the first and second retaining members and optically joining optical surfaces of the first and second optical transmission members.

24. The optical device of claim 23 wherein the first and second retaining members are composed of similar or like materials.

25. The optical device of claim 23 wherein at least one of the first and second optical transmission members includes one of the following:

at least one optical fiber,

at least one of optical waveguide,

a planar waveguide structure,

at least one optical emitting device,

at least one optical detecting device, and

at least one optical reflecting device.

26. The optical device of claim 23 wherein the first and second retaining members comprise at least one of, including combinations of at least one of the following materials:

metal,

stainless steel,

Fe-Ni-Co alloy,

glass,

organic polymer,

plastic, and

metallized ceramic.

27. The optical device of claim 23 wherein the first and second optical transmission members depend from corresponding first and second retaining members by at least one of, including combinations of at least one of the following:

metal solder,

glass solder,

organic adhesive,

epoxy, and

ultra-violet cure adhesive (UV-cure adhesive).

28. The method of claim 23 wherein at least one of the optical surfaces of the first and second optical transmission members has a thin film optical coating deposited thereon.